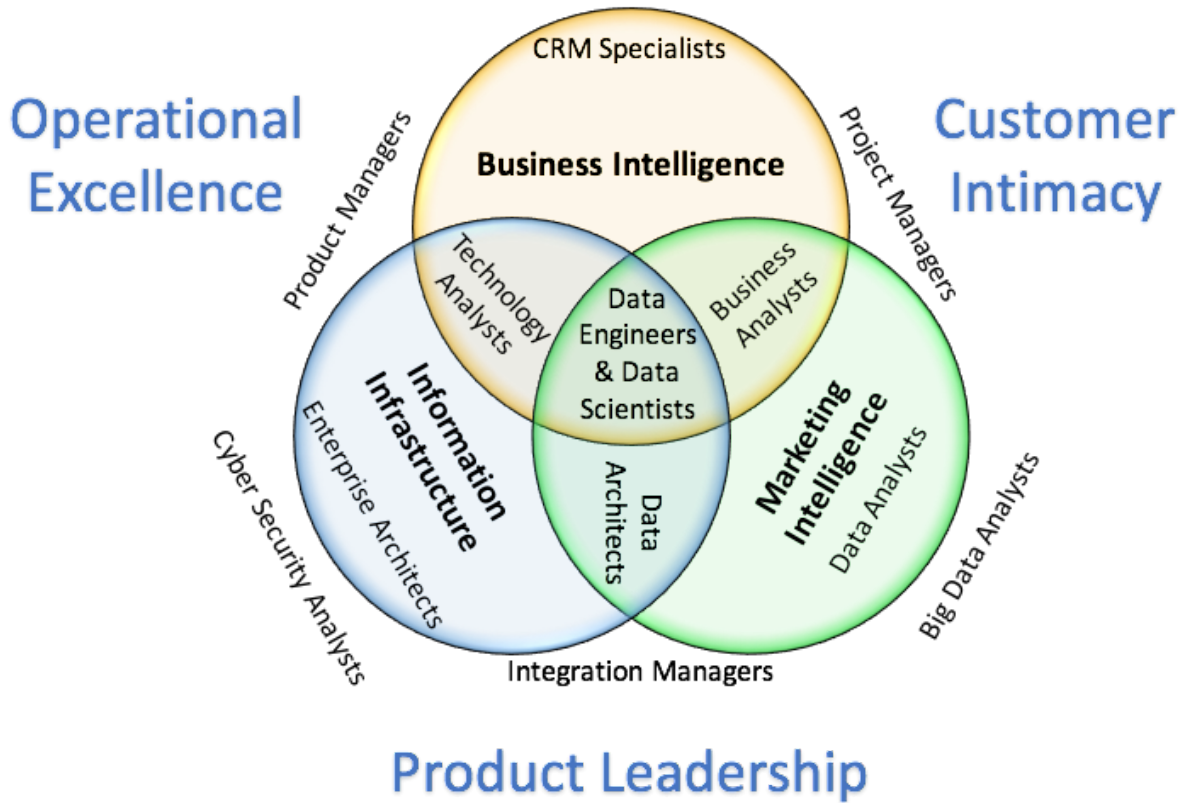




2017 MSIS Career Functions Roadmap



In this guide we will share with you the following information:

- [“In Their Own Words”: MS IS Alumni Insights For You About Their Job Today](#)
 - How the Smith MSIS Program relates to their job
 - Job Descriptions for their role in their company
- [O*Net Online Job Duties, Job Titles, Skills Needed for common MSIS Job Functions](#)
- [Short Description of most likely functional roles for MS Information Systems Graduates](#)
 - ❖ [Big Data Analysts](#)
 - ❖ [Business Analysts](#)
 - ❖ [CRM Analysts](#)
 - ❖ [Cyber Security Analysts](#)
 - ❖ [Data Analysts](#)
 - ❖ [Data Architects](#)
 - ❖ [Data Scientists](#)
 - ❖ [Enterprise Architects](#)
 - ❖ [Information / Data Engineers](#)
 - ❖ [Project Managers](#)
 - ❖ [System Integrators](#)
 - ❖ [Product Managers](#)
 - ❖ [Program Managers](#)
 - ❖ [Systems Analysts](#)



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MS IS Alumni - In Their Own Words

What is their job and how did Smith fit into their career search?

Business Analysts

- Healthcare IT [CNSI - Aditi Garg, Business Analyst](#)
- Gaming Software [Playstation Network - Nikita Ahuja, Business Analyst](#)
- Green Energy [Smart Utility Systems - Gautam Jain, Business Analyst](#)

Data Analysts

- Non-Profit [American Institutes for Research - Shashank Shastri, Senior Data Analyst](#)
- PaaS [AOL - Nerin Zhang, Data Analyst](#)
- SaaS [SkyScanner - Wan Floria, Data Analyst](#)

Technology Analysts

- Finance [Bank of America - Mohit Sachdeva, Technology Analyst](#)
- Finance [Goldman Sachs - Purva Sanwar, Technology Analyst](#)
- Finance [RBC Capital Markets - Vishal Punjab, Electronic Trading Technology Analyst](#)

Program Manager

- Cloud Services [Virtustream - Vinayak Vashista, Senior Technical Program Manager](#)

O*Net Online Job Duties, Job Titles, Skills Needed for common MSIS Job Functions

General MS Information Systems-related Job Function Descriptions, Applicable Job Titles & Skills Desired

- [Business Intelligence Analyst](#)
- [Data Warehousing Analysts](#)
- [Database Architects](#)
- [Technology Analysts](#)
- [Cybersecurity / Information Security Analysts](#)
- [Business Operations Analysts](#)
- [Database Administrators](#)
- [Risk Management Analysts](#)
- [Decision Systems Analyst](#)
- [Project Managers](#)
- [Management Analysts](#)



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Bank of America: Mohit Sachdeva, Technology Analyst

I'm working as tech business analyst, I believe the courses in Databases, Big Data, Data Models & decision helped me in polishing my resume & skillsets.

Job Description:

Applies technical knowledge in determining end to end design requirements for large projects involving line of business, software/hardware developers and vendors. Work closely with business partners to define strategies for technical solutions, determine requirements, and develop functional designs based on the analysis of line of business needs, objectives and existing systems infrastructure. Drives and participates in design, development and implementation of large and complex enterprise wide applications, often using new technologies. Work closely with developers and testers to ensure requirements and functional designs are translated accurately into working technical designs and that test plans and scripts serve customer needs. May manage projects including responsibility for a project and project budget. Works under minimal supervision on enterprise wide projects requiring creative solutions. IT degree preferred or substantially equivalent experience. Typically requires a minimum of 5-7 years of applicable experience.

Must understand, document, and clearly explain complex business requirements and processes

- Influence / recommend target state business architecture from current state
- Transform target state processes to a functional design
- Analyze and organize business data for easier understanding, access, and troubleshooting
- Define data and process governance. Must know how to apply governance even if it is not formally requested or required
- Able to create positive interactions with operations staff, change management, and technology
- Can bridge the gap between operational wants / needs and what technology delivers
- Capable of innovating operational improvements, by simplification or reducing operational risk

Required Skills

- Can demonstrate high level of critical thinking
- Experience with agile methodology
- Excellent written and verbal communication skills
- Willing to work in a highly demanding position with a global user base

Preferred Skills

- Prior experience as developer, data analyst, or technology manager in Capital Markets domain
- Able to look at data across multiple systems, identify and document legacy data anomalies, write and execute SQL, use of Excel functions and tools to assess and report data quality



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CNSI - Aditi Garg, Business Analyst

"I am currently working with State of Utah for building the MMIS system. My role is in the functional/design team where we develop requirement specification, Detailed system design documents for assigned subsystems. We conduct requirement validation activities, participating and leading collaborative sessions to document Medicaid business processes. MIS coursework helped me understand the business side of the company. As you remember we had a Business Analysis course taken by Ms. Kate(if I remember correctly). That is what I mostly do in my current position, we use Visio diagrams, UML, flowcharts to explain our clients the end-to-end solution while designing."

Job Description: Business Analyst Intern

CNSI a CMMI Maturity Level 3 company has established strong domain expertise in prominent industries, including Health, Defense and National Security, Government IT, Homeland Security and Transportation. We employ a world-class team of professionals all of whom have experience with large scale mission-critical IT implementations. CNSI is headquartered in Rockville, Maryland and we are on site in over 10 cities worldwide.

Job Duties / Responsibilities

- Assist the lead in conduct business analysis activities for project in support of Medicaid Design, Development, and Implementation (DDI) Project and on-going operations
- Work on requirements management activities under the guidance of Senior lead
- Review and become familiar with the WA MMIS system and business operations
- Assist in developing Requirements Specification, General System Design, Detailed System Design documents for assigned areas
- Participate in requirements validation activities
- Participate in collaborative sessions to document affected business processes ("as is" and "to be")
- Participate in creation of "as is" and "to be" business process work flows
- Participate in requirements analysis for their assigned business area
- Conduct functional testing for assigned business areas
- Work with Technical Intern and assist in presentations of requirements, design, and results.

Required Skills:

- Technical/professional degree
- Good documentation Skills
- Good Analytical Skills
- Good communication skills both Oral and Written
- Should be a self-starter and a team player



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Goldman Sachs, Purva Zanwar, Technology Analyst

“I am currently working in the Investment Banking division data analytics team at Goldman. My work involves gathering, transforming and modeling the data that will help the bankers and quants with their decisions. I think our course at Smith helped us develop a good foundation with not only the technical aspects of analyzing data but also asking the right questions and looking at it from a business perspective. “

Job Description: Post Execution Platform Analyst

Post Execution Platform supports and develops the firm’s middle-office systems across the entire securities division globally, and has a direct impact on the effective functioning of the firm’s trading and sales operations on a day-to-day basis. As a member of our team you will work closely with the securities business and technical colleagues to solve complex technical problems and contribute to commercially-effective technical solutions of evolving business requirements.

How will you fulfill your potential?

- Support the production environment, assist in the diagnosis and resolution of incidents, and maintain the stability and integrity of systems
- Design, develop, test and document highly reliable client and server-side systems in a structured, disciplined, and fast-moving environment
- Form strong client relationships with traders, operations, controllers, and other technology groups in an integrated business and technology environment
- Become an integral part of a global technology team
- Must be willing to work with proprietary technologies. No knowledge of proprietary technologies required pre-hire.

Basic Qualifications

- Bachelor’s or Master’s degree (US or foreign equivalent) in Computer Science or a related field
- 1-3 years programming in an object-oriented language (strongly preferred) such as C++, Java, C#, and/or programming in one or more procedural languages such as C
- Experience developing applications using relational databases and SQL
- Experience with scripting languages such as Python, Perl, shell scripting
- Experience with complex distributed systems and multi-tier architectures
- Experience working in the full Software Development Lifecycle (SDLC)
- Experience with complex debugging and root-cause analysis
- Experience interacting with end users and eliciting requirements

Preferred Qualifications

- Object-oriented database experience a plus
- Experience working in a global team
- Experience working in a financial services firm



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American Institutes for Research (AIR) - Shashank Sastri, Senior Data Analyst

“My job mostly involves Databases (SQL) and a bit of project management. Smith school already has courses that offers both these topics. As far as other data analysis roles go, smith really needs to develop on skills such as SAS and python. It will really help the students land a job. “

Job Description: Data Analyst

The American Institutes for Research (AIR) is a leading professional services firm with a growing software engineering and product development team. We design and build things that are inspiring and make a real impact in the online testing industry. We are currently seeking a Data Analyst (SQL) to join our software development group.

Responsibilities:

The Data Analyst (SQL) will be primarily responsible for the following:

- Integrate data from multiple data sets, analyze and interpret complex data sets and make findings relevant and actionable for both internal and external stakeholders
- Experience in setting up, deploying, configuring, and monitoring multiple systems
- Provide timely, accurate and reliable management reporting and analysis of data.
- Create innovative solutions to an extensive range of complex data analysis requests.
- Assist in the development of additional information system projects, as needed
- Verify data quality to ensure accurate analysis and reporting

Qualifications:

The position requires a Bachelor’s degree in MIS, Statistics, mathematics, Business Management or a related field and a minimum of 2-4 years of demonstrated experience (coursework or professional experience) with databases, SQL query development and at least one scripting language (Python, R, or other). Candidate must be detail-oriented with excellent analytical and quantitative skills. Demonstrated ability to apply innovative and resourceful solutions to solve challenges and the ability to meet detailed project goals while working independently. Must have excellent written and verbal skills with the ability to clearly organize thoughts and/or document content and convey complex concepts effectively regardless of audience. Must be proficient with Microsoft SQL Server and SQL Reporting Services, Microsoft Excel, Microsoft Access and other database tools.



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RBC Capital Markets - Vishal Punjab, Electronic Trading Technology Analyst

"I'm a part of the rotational technology analyst program at RBC Capital Markets. My first two rotations have been in Equity Derivatives Risk and Market Data and will be moving to the Algorithmic Trading group next week.

The job description has varied across groups I've been in, but some general things I've worked on are:

- Business Analysis and design for a risk calculation engine for the equities desk.
- Building out a deep learning framework to predict when systems connected to RBCs messaging infrastructure are going to have issues processing market data.
- Proof of concept for predicting when RBCs retail customers are likely to default on credit extended to them.
- NLP engine for a chat bot to provide order execution information to sales traders.

Some skills I've needed so far: NLP, Java, Python, neural networks, data modeling, business analysis, statistics concepts. Apart from the programming, courses at school helped me build strong concepts on all these skills.

The one key skill that smith helped me with is recognizing the value in data: defining use cases (business understanding of a technical problem), modeling data, selling the idea that machine learning can solve a lot of problems and how to implementing that idea. "

Job Description: Developer Analyst, Technology

RBC Capital Markets ("RBCCM") seeks a Developer Analyst, Technology, in New York, NY to support our Central Funding Group (CFG). Assess, research and analyze business and system needs, exploring alternative options to recommend technology solutions and designs that meet sponsor needs and PLC deliverables including component reusability, data sharing and security. Develop, code, document, and execute unit test, system, integration, and acceptance test using different languages and testing tools for functions of high complexity. Develop detailed plans and accurate estimates for completion of build, system testing, and implementation phases of project.

Requires a Bachelor's degree in Information Technology, Computer Science, or a related field, plus 5 years of progressively responsible experience in financial/quantitative development that includes accruals, mark to market, and the interface between risk and finance systems. Development experience must include C++, Java, the full JEE technology stack, XML, and messaging. CFA designation required



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Virtustream - Vinayak Vashishta, Senior Technical Program Manager

“I started as a Sr Technical Program Manager with Virtustream recently. All my role is in the hardware and data centers world now. I would say Project Management, Data Network Infrastructure, Business Process Analysis and Big Data (Linux skill set) are my helping me in my current role. Though my Masters focussed on data science and analytics, I have moved out of that field to Program/Project management side.”

Job Description: Technical Program Manager

Virtustream’s Cloud Platform Operations (CPO) organization builds and operates Virtustream’s Infrastructure-as-a-Service (IaaS) platform to enable Virtustream to offer enterprise-class cloud solutions to its customers. CPO PMO’s charter is to plan, lead and deliver strategic and operational CPO activities by employing sound project management processes and practices.

The Analyst, Tech Program Manager will assist PMO managers and senior Project Managers by administering, coordinating and managing various PMO-related activities and project management tasks.

Critical Hiring Criteria Responsibilities -

- Own the responsibility to maintain health of the PMO Dashboard
- Assist PMO Director by hosting 3 times-a-week PMO project status check point calls
- Compile regular and on demand reports
- Be the administrator / super user of the PMO tools
- Manage relatively simple projects, including PMO tools implementation projects
- Assist senior PMs as a backup PM

Qualifications -

- Must have excellent verbal & written communication skills
- Must have good organization skills
- Must have good situational awareness
- Must have good cultural awareness
- Must have some foundational / basic knowledge of project management but no experience is required
- Must have some foundational / basic knowledge of computing and information technology
- Must have good problem solving skills
- PM-related certification (PMO, CSM, etc.) plus but not required



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Playstation Network - Nikita Ahuja, Business Analyst

“My responsibilities revolve around process enhancements in SAP and developing reporting using Qlikview and SAP business warehouse. For this particular role, business process analysis and data analytics courses have been really helpful. Although, most of the students considered BPA as the most easy course then, but it is certainly more difficult in the real world when you are trying to draw up a process by interviewing business process owner. Also, every business process owner you meet, the process analysis steps are completely different and need thorough study before starting analysis. Likewise for data analytics. “

Job Description: Business Systems Analyst

The Business Systems Analyst reports to the Manager, Business Systems Integrations within Business Services. The Business Systems Analyst is expected to manage and support Sony Interactive Entertainment, WWS QA business systems as well as help lead and deliver on upcoming system and process improvement implementation efforts

Responsibilities:

Project Management

- Develop detailed implementation and upgrade project plans, and maintain relevant documentation
- Provide timely project reporting/feedback to management at regular intervals
- Act as a lead on business systems projects
- Coordinate with project team members and delegate tasks to junior Systems Analysts on the team
- Prepare time and cost estimates for completing projects

Business Systems Analysis

- Foster and maintain a collaborative relationship with key business and technical partners
- Gather requirements using interviews, document analysis, requirements workshops, storyboards, surveys, business process descriptions, use cases, scenarios, business analysis, and/or task and workflow analysis
- Evaluate information gathered from multiple sources, reconcile conflicts, and decompose high-level business and user requirements appropriate level of detail
- Develop use cases, flow charts, data models, database design, entity relationship diagrams, etc.
- Collaborate with developers and subject matter experts to establish the design vision and analyze tradeoffs between usability and performance needs
- Investigate, analyze, evaluate, and estimate costs/benefits of existing and for future business systems
- Reviews technical design documents, development integration and quality assurance test plans for conformance to design



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Smart Utility Systems - Gautam Jain, Business Analyst

“My job in Smart Utility Systems is to assist implementation team with sharing my analysis by capturing and filtering business requirements as per my company's current & future feasibility. I am a to go person for my manager for handling technical & managerial conversation with business stakeholders and vendors. Graduating with MS IS from UMD, I was able to find my place in fast growing 200-500 employee organization in Orange County. Our coursework in R programming, SQL, Business Process Analysis & Project Management assisted in identifying my areas of interest and hence desire to work in that direction. Additionally, OCS at Smith, also assisted me a lot by preparing for handling challenging interview sessions and negotiation skills a lot. I would strongly recommend all the fellow Terps to be in touch with OCS and be at ease with discussing all the jittery questions for 1st job after graduation in the States.”



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AOL - Ningyi(Nerin) Zhang, Data Analyst

“Few things at school helps at work. real world projects on big data and data mining courses. It's great to learn things from book. But using the skills for real is another story. Projects I did definitely gave me a lot of hands on experience which is very useful. Also our course work help me to gain business sense. That part also helps.“

Job Description: Business Intelligence Analyst

AOL is seeking a Business Intelligence Analyst to join the Analytics group as part of a fast-paced and highly capable team providing strategic and tactical support to our global digital media business. This team is part of the Business Analytics group that powers AOL's insight into content creation and monetization. Play a lead role in shaping the integration of acquisitions, creating governance around data best practices, and the way C-level executives, GMs, editorial staff, finance and business leaders understand attainment against core KPI's. This person must have strong BI skills (SQL and Scripting) and experience with digital media.

Open to candidates in Dulles, DC, Baltimore and NYC.

RESPONSIBILITIES

- Ability to execute full data engineering life cycle from gathering requirements, designing/testing code/scripts, and to releasing into production environment.
- Identify performance trends, drive insight generations, propose solutions, and implement actions / escalate issues as necessary
- Be fully independent in data analytics by extracting/querying from data bases, building SQL pivots and developing/manipulating data cubes, as necessary
- Synthesize learnings and prepare effective presentations (verbal and written) for project teams and business leaders
- Establish solid working relationship with the stakeholders and become a close partner with respect to reporting, data and intelligence needs
- Manage the deliveries of regular and ad hoc request in a timely manner to assist senior management/business owners in understanding the data and gain value from it

SKILLS REQUIRED

- Excellent communication and presentation skills (Tableau, PPT, email) to effectively report findings and influence change within the organization.
- Must have experience working on projects with complex analytical and operational aspects; overseeing direct and indirect resources
- Expert knowledge of spreadsheet applications such as Excel, with advanced working knowledge of pivot tables.
- Ability to write SQL queries and familiarity with Oracle, Vertica, or SQL Servers
- Must be detail-oriented, highly accurate and possess excellent problem-solving skills.



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SkyScanner - Wan Floria, Data Analyst

“My job concentrates more on statistical analysis, modeling, and a little bit of coding. So the technical foundation courses were really helpful. I was interviewed on and working at:

- A/B test: the use case for statistical inference and hypothesis test in our course, it is very popular/important for websites/apps analysis.
- Tableau: a visualization tool for data. It was a tool introduced in Big Data Project.
- Data mining algorithms. All was introduced in the elective course on data mining.
- Coding SQL: introduced in Database Management. But the course didn't include some functions such as rank(), split().
- NLP: was introduced in both data mining course and Big Data project.
- Analysis on some projects: the models was covered in Managing Digital Business Markets and Strategic & Transformational IT courses. But cases was not as complicated as in the assignments.

What are also important in my job but not covered in our courses:

- Python, or say, the basics for coding.
- Deep Learning: the concept was introduced in our data mining course, but it may be better if we have some projects on it.
- Coding and Testing with Git, and Docker. They are really important infrastructures for IT development.”

Short Description of Most Likely Functional Roles for MS Information Systems Graduates

While the vast majority of job titles of Smith MS Information Systems graduates end in the word Analyst - there are significant differences in what the job requirements are and what the job duties are day-after-day depending upon the industry and the niche portion of the market the company you work for is trying to fill. This guide is designed to help MS Information Systems students make the connection between Job Functions, Companies and Industries so they can focus their search on opportunities aligned with the student's personal strengths and career ambitions.

In general, the functional outputs of Information Systems help companies improve along major competitive vectors: improving customer intimacy, developing innovative products and services, and making efficient use of scarce resources. All vectors rely on information systems and the data they collect and present to decision-makers. As you begin your job search you will find that job titles do not mean the same thing to every employer, so it is important to understand which



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functional position you are hoping to find yourself in within an organization - closer to business decision-making, marketing & product development, or working with infrastructure and systems.

Big Data Analysts

Application of the same advanced statistical predictive and modeling algorithms used in other forms of business analytics but using specialized data processing tools like MapReduce on large data processing platforms like Amazon Web Services that are capable of running processes on very large datasets. Data sources include sensor and metadata used in Internet of Things data mining, as well as social media data. Skills required in this field skew toward greater fluency in coding.

Business Analysts

Understanding a business environment, the people and processes used within the environment, and how they relate to the information systems being used to achieve results. Business analysts skills requirements skew toward strong interpersonal communications skills and detail-oriented documentation of workflows, needs and capabilities.

CRM Analysts

Understanding the journey required to convert an anonymous potential customer into a satisfied, loyal repeat customer. CRM systems include software, data, analytics and human workflows. Skills within the realm of CRM systems are evenly spread between technical coding, stakeholder management and business strategy.

Cyber Security Analysts

Understanding the nature, impact and risk of information systems security breaches. Cyber security is part of enterprise architecture and planning, physical environment planning, virtualization and data transmission planning. Analysts in Cyber Security environments skills skew toward data analytics and systems engineering.

Data Analysts

Capturing and processing data into information products useful in decision-making by management stakeholders. Data is collected and analyzed to answer questions, test hypotheses or disprove theories. A data analyst will learn the data requirements, collect and pre-process and clean datasets, perform data exploration and apply statistical modeling techniques. Data products are then analyzed for accuracy and interpretive value.



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Data Architects

A data architect is a practitioner of data architecture, an information technology discipline concerned with designing, creating, deploying and managing an organization's data architecture. Data architects define how the data will be stored, consumed, integrated and managed by different data entities and IT systems, as well as any applications using or processing that data in some way. A data architect is expected to set data architecture principles, create models of data that enable the implementation of the intended business architecture, create diagrams showing key data entities, and create an inventory of the data needed to implement the architecture vision.

Data Scientists

Data scientists apply interdisciplinary scientific methods, processes and systems to extract knowledge or insights from data in various forms, either structured or unstructured, similar to data mining. They employ techniques and theories drawn from many fields within the broad areas of mathematics, statistics, information science, and computer science, in particular from the subdomains of machine learning, classification, cluster analysis, data mining, databases, and visualization.

Enterprise Architects

Enterprise architects work with stakeholders, both leadership and subject matter experts, to build a holistic view of the organization's strategy, processes, information, and information technology assets. The role of the enterprise architect is to take this knowledge and ensure that the business and IT are in alignment. The enterprise architect links the business mission, strategy, and processes of an organization to its IT strategy, and documents this using multiple architectural models or views that show how the current and future needs of an organization will be met in an efficient, sustainable, agile, and adaptable manner.

Information / Data Engineers

Information engineering involves an architectural approach to planning, analyzing, designing, and implementing applications. Information engineering has many purposes, including organization planning, business re-engineering, application development, information systems planning and systems re-engineering. Information engineers will perform entity analysis, function analysis and process dependency, process logic analysis, entity type lifecycle analysis, matrix cross-checking, normalization, cluster analysis, data flow and data analysis.



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Project Managers

IT project managers must be skilled in project management methodologies, such as waterfall, DSDM, and Agile Scrum. These project management methodologies are based on the uncertainty of developing a new system and advocate smaller, incremental development cycles to control scope, time, budget and quality of deliverables. Familiarity with the Software Development Life Cycle (SDLC), requirements gathering, application development, logical and physical database design and networking is essential.

System Integration Managers

A systems integrator specializes in bringing together component subsystems into a whole and ensuring that those subsystems function together. A system integrator needs a broad range of skills and is likely to be defined by a breadth of knowledge rather than a depth of knowledge. These skills are likely to include software, systems and enterprise architecture, software and hardware engineering, interface protocols, and general problem solving skills. It is likely that the problems to be solved have not been solved before except in the broadest sense. They are likely to include new and challenging problems with an input from a broad range of specialists where the system integration engineer "pulls it all together."

Technical Product Managers

Product managers are often thought of as sitting at the intersection of business, design, and technology. Within an agile development environment day-to-day responsibilities of a product manager include creating and prioritizing the product backlog, which is a list of things to be done by the development team. The details of how the feature is developed are worked out by developers and designers. At the end of the development sprint, the product manager is responsible for verifying that the acceptance criteria have been met; only then is the work on the feature officially done.

Technical Program Managers

Program management is the process of managing several related projects, often with the intention of improving an organization's performance. In a program there is a need to identify and manage cross-project dependencies and often the project management office (PMO) may not have sufficient insight of the risk, issues, requirements, design or solution to be able to usefully manage these. The program manager may be well placed to provide this insight by actively seeking out such information from the project managers.



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Technology / Systems Analysts

A technology analyst assesses the suitability of information systems in terms of their intended outcomes and liaise with end users, software vendors and programmers in order to achieve these outcomes. Systems analysts may serve as change agents who identify the organizational improvements needed, design systems to implement those changes, and train and motivate others to use the systems. They use their technical knowledge to guide decisions related to hardware or software development. They may be responsible for developing cost analysis, design considerations, staff impact amelioration, and implementation timelines. A technology analyst is typically confined to an assigned or given system and will often work in conjunction with a business analyst. A business analyst will evaluate the business need and identify the appropriate solution and, to some degree, design a solution without diving too deep into its technical components, relying instead on a technology analyst to do so. A technology analyst will often evaluate code, review scripting and, possibly, even modify such to some extent.